

Evaluating the Adequacy of Ecotourism Services in the Himalayan Regions of Rudraprayag, Uttarakhand

Arun Singh*, Nandan Singh Bisht**, Amit Melkani***

Abstract

This study investigates the adequacy of ecotourism-related services and facilities in the Kedarnath, Madhyamaheshwar, and Tungnath regions of Rudraprayag district, Uttarakhand-areas known for their ecological significance and religious tourism. With growing tourist inflow in these Himalayan destinations, assessing infrastructure and service quality is critical to ensuring sustainable tourism development. Data were collected from 270 tourists through structured, closed-ended questionnaires using a 5-point Likert scale, and analyzed using descriptive statistics. Thirteen key variables related to physical, financial, communication, health, and tourism infrastructure were evaluated. The results show that all services were rated above the neutral threshold of satisfaction, indicating an overall perception of adequacy. High satisfaction was reported for information centers, sanitation, and transportation, while medical services and tour operator facilities scored relatively lower, suggesting specific areas for improvement. The findings support the hypothesis that current ecotourism services and facilities in the study area are adequate. The study highlights the need for targeted enhancements to improve tourist experiences and promote long-term, sustainable ecotourism development in rural Himalayan regions.

Keywords: Services and Facilities, Infrastructure, Eco-Tourism, Sustainable Tourism, Tourist Satisfaction, Rudraprayag

* Research Scholar, Department of Economics, D.S.B. Campus Kumaun University Nainital, Email- arunsinghpanwarmail@gmail.com

** Assistant Professor, Department of Economics, D.S.B. Campus Kumaun University Nainital, Email- nandan32.almora@gmail.com

*** Research Scholar, Department of Economics, D.S.B. Campus Kumaun University Nainital, Email- amit.xyz30@gmail.com

Introduction

Tourism is a major driver of economic activity globally and contributes significantly to the gross domestic product (GDP) of many countries. Among its various forms, ecotourism has emerged as a sustainable alternative to mass tourism, particularly in ecologically sensitive and culturally rich regions such as the Indian Himalayas. It emphasizes responsible travel to natural areas, aiming to conserve the environment and enhance the well-being of local communities, even while delivering economic benefits.

In India, and particularly in the state of Uttarakhand, ecotourism has gained considerable significance due to the region's unique combination of biodiversity, scenic beauty, and spiritual heritage (Manral, 2018). The Rudraprayag district, home to prominent pilgrimage and trekking destinations like Kedarnath, Madhyamaheshwar, and Tungnath, offers immense potential for ecotourism development. However, the success and sustainability of ecotourism in such areas depend largely on the availability and adequacy of supporting infrastructure and services that ensure visitor satisfaction, safety, and environmental conservation.

Tourism operates fundamentally as an experience-based industry, wherein the core offering is the provision of memorable and meaningful experiences to travelers. These experiences are shaped by the various products and services encountered by tourists throughout their journey, including transportation, accommodation, attractions, and customer service. Tourist satisfaction is primarily determined by the extent to which their actual experiences align with or surpass their pre-travel expectations. When actual experiences exceed expectations, tourists are likely to report high levels of satisfaction. Conversely, when experiences fall short of expectations, dissatisfaction is likely to occur, potentially influencing future travel decisions and destination loyalty (Saayman et al., 2018).

The hospitality extended by local communities, along with the assurance of safety and cleanliness, plays a crucial role in shaping tourists' preferences. These factors significantly influence the overall travel experience. To ensure long-term tourist satisfaction and sustainable tourism development, service providers must prioritize the quality of services and infrastructure. This includes maintaining accommodations and food establishments,

improving sanitation, and enforcing cleanliness regulations, such as fines for littering. These measures not only enhance a destination's appeal but also promote hygiene awareness among tourists and local stakeholders (Bagri et al., 2015).

Tourists from diverse cultural backgrounds often place value on different aspects of the tourism experience, and may therefore have varying levels of satisfaction with the same service. Understanding these differences is essential for creating culture-oriented marketing and improving service quality. Additionally, tourist satisfaction is a multi-dimensional concept, making its assessment more complex than evaluating a single service provider (Chen et al., 2013).

Ecotourism can be a powerful tool for rural development; however, this requires a thorough analysis of infrastructure such as roads, transportation, water supply, accommodation, communication, and healthcare (Nugroho et al., 2016). Even the most scenic or culturally rich destinations can be bypassed if they lack basic accessibility and services. Thus, realizing the full potential of ecotourism requires comprehensive assessments of existing services to identify areas needing improvement and to support sustainable tourism in rural areas.

Due to increasing tourist inflow, many Himalayan regions are now facing challenges related to inadequate facilities, poor waste management, and limited healthcare and communication services. Therefore, assessing the current status of these services is essential for guiding sustainable tourism planning in these fragile ecosystems.

In response to the growing need to accommodate sustainability concerns to tourism, the Government of Uttarakhand has introduced several policies and initiatives to support ecological tourism. These include the Deendayal Upadhyay Homestay Scheme (2018), which promotes local culture and curbs migration by supporting locally-run accommodations, and the drafting of the Tourism Policy 2022, aimed at regulatory modernization. Infrastructure projects like the Sonprayag-Kedarnath ropeway, and the creation of the Shri Kedarnath Utthan Charitable Trust (2017) for post-disaster reconstruction, are part of broader efforts to make the state a safe, tourist-friendly ecological destination with improved infrastructure and local employment opportunities.

In this context, the present study aims to evaluate the adequacy of ecotourism-related services and facilities in the Kedarnath, Madhyamaheshwar, and Tungnath regions of Rudraprayag district. The findings will help identify existing strengths and service gaps, offering valuable insights for policymakers, planners, and stakeholders committed to promoting sustainable and responsible tourism in Uttarakhand.

Study area

The study was conducted in the Kedarnath, Madhyamaheshwar, and Tungnath regions of the Rudraprayag district in Uttarakhand, India. These areas are situated in the Middle and Greater Himalayan ranges and are known for their ecological richness, religious importance, and scenic trekking routes, attracting both pilgrims and ecotourists. Rudraprayag district spans approximately 1,984 square kilometers and has the highest rural population in Uttarakhand, with 95.90% of its residents living in rural areas (Census 2011). The selected sites are part of the renowned Panch Kedar pilgrimage circuit and offer a unique blend of spiritual, cultural, and natural attractions. Field data were collected through structured interviews conducted between April-August 2022, followed by field observations in 2023. The selection of this area was based on its high ecotourism potential, increasing tourist inflow, and the need to assess the adequacy of existing services and infrastructure to support sustainable tourism development.

Methodology

The study utilized a structured, closed-ended questionnaire to collect data from 270 tourists, with 90 randomly selected from each of the three regions- Kedarnath, Madhyamaheshwar, and Tungnath during April to August 2022. The questionnaire assessed tourist satisfaction across various ecotourism services and facilities using a 5-point Likert scale ranging from “very satisfied” to “not satisfied.” The involvement of a local researcher fluent in the area’s language and customs helped facilitate effective communication and ensured reliable responses. The quantitative data were analyzed using descriptive statistics to evaluate the adequacy of current ecotourism services and infrastructure.

Statistical Analysis

The collected data were analyzed using descriptive statistical methods to assess tourist satisfaction with ecotourism services and facilities. Thirteen key variables were identified, including infrastructure (transportation, accommodation, sanitation, drinking water, waste disposal), communication (telecommunication, information centers), financial services (banking, cost of trip, service charges), health (medical services), and tourism support (food and beverage, tour operator facilities). Each variable was rated on a 5-point Likert scale, where 1 indicated "not satisfied" and 5 indicated "very satisfied." Mean scores for each variable were calculated and compared against the neutral value of 3. A mean score above 3 was interpreted as indicating adequacy of the service or facility, while a score equal to or below 3 suggested inadequacy.

Results and Discussion

The results of the study indicate that tourists visiting the Kedarnath, Madhyamaheshwar, and Tungnath regions of Rudraprayag generally perceive the available ecotourism services and facilities as adequate. Thirteen key variables were assessed using a 5-point Likert scale, with a neutral value of 3 serving as the benchmark for adequacy. All thirteen variables recorded mean scores above 3, suggesting a positive level of satisfaction among tourists.

The highest satisfaction levels were reported for Information Centres (Mean = 4.60), Cost of Trip (4.39), and Sanitation Services (4.24), indicating that tourists find these services well-organized and helpful in enhancing their travel experience. Transportation and Road Facilities (4.16), Telecommunication (4.23), and Waste Disposal (4.11) also scored well, reflecting strong infrastructure support in these remote mountainous areas.

While all services were rated as adequate, Medical Services (Mean = 3.22) received the lowest score, though still above the neutral threshold. This indicates a potential area for improvement, particularly considering the high-altitude terrain and physical demands of ecotourism in the region. Moderate scores were also observed for Tour Operator Facilities (3.51) and Accommodation (3.61), suggesting opportunities to enhance the quality and professionalism of these services.

These findings support the research hypothesis that the current services and facilities related to ecotourism in the study area are adequate. However, they also highlight specific areas- especially healthcare and tour management- where further investment and policy attention are needed. Enhancing these services would not only improve tourist satisfaction but also contribute to the long-term sustainability and competitiveness of ecotourism in Rudraprayag. The results underscore the importance of maintaining and upgrading essential infrastructure to support growing tourism demand while ensuring environmental conservation and community welfare.

Satisfaction Level	N	Neutral Value	Mean	Adequate
Food and Beverage	270	3	3.714815	Adequate
Transportation and Road Facilities	270	3	4.162963	Adequate
Banking services	270	3	3.455556	Adequate
Accommodation	270	3	3.614815	Adequate
Telecommunication	270	3	4.233333	Adequate
Sanitation services	270	3	4.240741	Adequate
Medical services	270	3	3.225926	Adequate
Cost of trip	270	3	4.392593	Adequate
Information Centre	270	3	4.6	Adequate
Drinking water facilities	270	3	3.962963	Adequate
Waste disposal	270	3	4.114815	Adequate
Tour operator facilities	270	3	3.514815	Adequate
Service Providers Charge	270	3	3.651852	Adequate

Table 01: Descriptive Statistics Summary of tourist satisfaction related to different services and facilities

Kruskal-Wallis Test Results and Interpretation: To further analyze the variations in tourist satisfaction across the three study regions- Kedarnath, Madhyamaheshwar, and Tungnath- a Kruskal-Wallis equality-of-populations rank test was applied to the data. This

non-parametric test was chosen due to its effectiveness in comparing ordinal satisfaction data across multiple independent groups. The test was conducted at a 5% level of significance ($\alpha = 0.05$) and 95% confidence interval to determine whether statistically significant differences existed in satisfaction levels for each of the thirteen identified service and facility indicators.

The results (see Table 02) show that for the majority of the variables, the p-value was less than 0.05, indicating significant differences in satisfaction levels among tourists across the three regions. Notably, significant differences were observed in satisfaction with Transportation and Road Facilities (P-value = 0.0001), Accommodation Services (P-value = 0.0001), Waste Disposal (P-value = 0.0001), Information Centres (P-value = 0.0001), Medical Services (P-value = 0.0001), Food and Beverage Services (P-value = 0.0001), and others. These findings suggest that tourist satisfaction with these services varies significantly depending on the location, possibly due to differences in local infrastructure quality, management, or accessibility. For instance, tourists may have found road conditions or waste disposal systems better in one region compared to the others, leading to the observed disparities in satisfaction levels.

On the other hand, variables such as Telecommunication (P-value = 0.5353), Drinking Water Facilities (P-value = 0.1820), Cost of Trip (P-value = 0.1522), and Tour Operator Facilities (P-value = 0.0597) did not show statistically significant differences across the regions. This indicates that tourists perceived these services similarly in all three locations, possibly due to uniform pricing structures, mobile network penetration, or standardized tour operations in the region.

Satisfaction Level	Chi-squared	d.f.	P- value	Result
Food and Beverage	59.673	2	0.0001	Significant difference
Transportation and Road Facilities	58.613	2	0.0001	Significant difference
Banking services	17.962	2	0.0001	Significant difference
Accommodation services	36.930	2	0.0001	Significant difference

Telecommunication facilities	1.250	2	0.5353	No significant difference
Sanitation services	12.069	2	0.0024	Significant difference
Medical services	25.699	2	0.0001	Significant difference
Satisfaction with cost of trip	3.766	2	0.1522	No significant difference
Information Centre	42.161	2	0.0001	Significant difference
Drinking water facilities	3.407	2	0.1820	No significant difference
Waste disposal	53.078	2	0.0001	Significant difference
Tour operator facilities	5.637	2	0.0597	No significant difference
Service Providers Charge	48.172	2	0.0001	Significant difference

Table 02: Kruskal-Wallis equality-of-populations rank test Result

Overall, the Kruskal-Wallis test results provide deeper insight into region-wise variations in service adequacy. While the general perception remains positive- as supported by the descriptive analysis- these findings highlight specific services where inter-regional disparities exist. Addressing these inconsistencies can lead to a more balanced and uniformly satisfying ecotourism experience for visitors across all sites in Rudraprayag.

Conclusion

This study assessed the adequacy of ecotourism-related services and facilities in the Kedarnath, Madhyamaheshwar, and Tungnath regions of Rudraprayag district, Uttarakhand. Based on responses from 270 tourists and the analysis of thirteen key service variables, the findings reveal that all measured facilities were rated above the neutral satisfaction level, indicating that tourists generally perceive the current infrastructure as adequate. High satisfaction scores for information centers, sanitation, telecommunication, and transportation reflect well-developed support systems for ecotourism in the region. However, relatively lower scores for medical services and tour operator facilities highlight areas that require improvement. Overall, the results indicate that the region is equipped to support ecotourism activities effectively. Strengthening weaker areas through targeted infrastructure and service enhancements will further improve tourist experiences, promote sustainable tourism development, and contribute to local economic growth in this rural Himalayan district.

The study concludes that ecotourism services and facilities in the Kedarnath, Madhyamaheshwar, and Tungnath regions are generally adequate, with tourists expressing overall satisfaction. However, statistical analysis using the Kruskal-Wallis test revealed significant differences in satisfaction levels across regions for several services, including transportation, accommodation, and waste management. Some services, such as telecommunication and drinking water, showed consistent satisfaction across all areas. While the overall infrastructure supports ecotourism effectively, targeted improvements- especially in healthcare, accommodation, and tour operations- are needed to ensure balanced and sustainable tourism development throughout the district.

References

- Ar. Bhavna Agarwal, D. A. (2020, August). "AN EMERGENCE OF ECOTOURISM IN MOUNTAINS: A CASE STUDY OF NEPAL & BHUTAN'S ECOTOURISM ECOLOGY". *International Research Journal of Engineering and Technology*, 07(08).
- Bagri, S. C., & Kala, D. (2015). Tourists' satisfaction at Trijuginarayan: an emerging spiritual and adventure tourist destination in Garhwal Himalaya India. *Turizam*, 19(4), 165-182.
- Balodi, K. N., Naithani, S., Kaur, J., Singh, A., & Chauhan, A. S. (2014). Eco-tourism: A sustainable livelihood option for mountainous communities in Uttarkashi, Uttarakhand, India. *Journal of Studies in Dynamics and Change (JSDC)*, 1(8).
- Binoy, T. A. (2008, July). "Ecotourism for Ecofriendly Guest and Green Host- A case study on Thenmala Ecotourism Project, Kerala". *JOURNAL OF TOURISM STUDIES*, 3(1).
- Chaturvedi, G. (2004). State and Development: Changes in livelihood strategies in garhwal with special reference to ecotourism in the Gangotri Region. *Journal of Mountain Science*, 1(3), 223-238.
- Chen, Y., Zhang, H., & Qiu, L. (2013, January). A review on tourist satisfaction of tourism destinations. In *LISS 2012: Proceedings of 2nd international conference on logistics, informatics and service science* (pp. 593-604). Berlin, Heidelberg: Springer Berlin Heidelberg.
- Das, B. L. (2012, June). " A STUDY ON ECO-TOURISM POTENTIAL IN TRIPURA, NORTH-EAST INDIA". *Indian Streams Research Journal*, 1(4), 1-4.

Das, I. H. (2013, September). " Study of Ecotourism: A Special Reference to Assam". *Indian Journal of Applied Research*, 3(9).

Demkova, M., Sharma, S., Mishra, P. K., Dahal, D. R., Pachura, A., Herman, G. V., ... & Matlovicova, K. (2022). Potential for sustainable development of rural communities by community-based ecotourism a case study of rural village Pastanga, Sikkim Himalaya, India. *GeoJournal of Tourism and Geosites*, 43(3), 964-975.

Dey, T., Kamruzzaman, M., Islam, M. A., Bachar, B. K., & Pitol, M. N. S. (2020). Attitudes of local people towards community based eco-tourism in the Sundarbans. *International Journal of Business, Management and Social Research*, 9(02), 528-535.

Gidebo, H. B. (2019). Attitude of local communities towards sustainable tourism development, the case of Nech Sar National Park, Ethiopia. *International Journal of Advanced Research*, 7(3), 650-663.

Gupta, S., Anand, S., & Gwal, S. (2018). Inbound tourism in Uttarakhand, India, before and after the 2013 Kedarnath disaster—evidence derived from social networking sites using GIS. *Current Science*, 1755-1759.

Gupta, S. K., & Bhatt, V. P. (2009). Community based tourism development: a case-study of eco village Sari in Kedarnath sanctuary region. *International Journal of Hospitality and Tourism Systems*, 2(1), 135.

Hussain Iftikhar, a. D. (2013, September). "Study of Ecotourism: A Special Reference to Assam". *Indian Journal of Applied Research*, 3(9).

Jianwei Qian, H. S. (2018, February). "Research in Sustainable Tourism: A Longitudinal Study of Articles between 2008 to 2017". 10(3), 1-13.

Joshi, K. C., & Bagri, S. C. (2021). An Assessment of the Sustainable Tourism Development and Planning Approach of Kedarnath Pilgrimage Circuit Post 2013 Disaster. *Journal of Mountain Research*, 16(3), 10-21.

Kala, C. P. (2013). Ecotourism and sustainable development of mountain communities: A study of Dhanolti Ecopark in Uttarakhand state of India. *Applied Ecology and Environmental Sciences*, 1(5), 98-103.

Kumari, N. (2021). Impact of Eco-Tourism on the Indian Economy. *Gap Interdisciplinarity*, 12-16.

Kumar, P., Gupta, P., & Prakash, V. (2014). Rethinking Sustainable Tourism Development: A Demand for Environmental and Social Revival from Kedarnath Disaster in Garhwal Region of Uttarakhand.

Magray, N. A. (2018, October). "Ecotourism: an adversity in itself with special reference to Jammu & Kashmir". *International Journal of Global Science Research*, 5(2).

Manral, U. (2018). Kedarnath Wildlife Sanctuary: Nature-culture linkages in a sacred landscape in Indian Himalayan Region. *世界遺產学研究*, (2018), 26-33.

Misra, S., Maikhuri, R. K., Dhyani, D., & Rao, K. S. (2009). Assessment of traditional rights, local interference and natural resource management in Kedarnath Wildlife Sanctuary. *International Journal of Sustainable Development & World Ecology*, 16(6), 404-416.

Mudasir, N., Ghausee, S., & Stanikzai, H. U. R. (2020). A review of ecotourism and its economic, environmental and social impact. *Journal of emerging technologies and innovative research*, 7(8), 1739-1743.

Mujrai P. (2022). Contribution of Economy to Eco-Tourism in India. *Journal of Research & Development*, 13(10).

Nath, J., & Nath, A. (2018). Scope and challenges in ecotourism: a comprehensive study in Indian context.

Nimase, A. G., Sule, B. M., & Barakade, A. J. (2012). Status of wild life and tourist attraction's: a case study of Chandoli Wildlife Sanctuary in Maharashtra.

Nugroho, I., Pramukanto, F. H., Negara, P. D., Purnomowati, W., & Wulandari, W. (2016). Promoting the rural development through the ecotourism activities in Indonesia. *American Journal of Tourism Management*, 5(1), 9-18.

Pal Anil, B. P. (2016, June). "Potential of Ecotourism in Dehradun District, Uttarakhand". *International Journal for Environmental Rehabilitation and Conservation*, 7(1), 01-10.

Parkash, M. P. (2014). "Eco-tourism and its Development in Tribal Regions of Himachal Pradesh". *International Journal on Arts, Management and Humanities*, 3(1), 24-29.

Ramaswamy, S., & Sathis Kumar, G. (2010). Tourism and Environment: Pave the Way for Sustainable Eco-Tourism. *Tourism and Environment: Pave the Way for Sustainable Eco-Tourism* (March 5, 2010).

Saayman, M., Li, G., Uysal, M., & Song, H. (2018). Tourist satisfaction and subjective well-being: An index approach. *International Journal of Tourism Research*, 20(3), 388-399.

Sati, V. P. (2013). Development of Eco-Tourism and Hydroelectricity. In *Towards Sustainable Livelihoods and Ecosystems in Mountain Regions* (pp. 91-101). Cham: Springer International Publishing.